



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**06.02.2002 Bulletin 2002/06**

(51) Int Cl.7: **B24D 18/00, B24D 13/12,  
B24B 9/06**

(21) Application number: **01830491.5**

(22) Date of filing: **23.07.2001**

(84) Designated Contracting States:  
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU  
MC NL PT SE TR**  
Designated Extension States:  
**AL LT LV MK RO SI**

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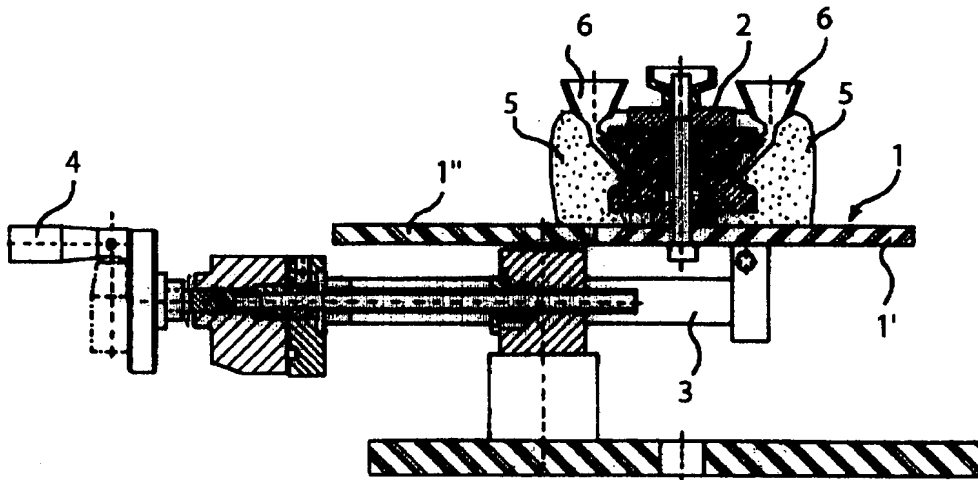
(30) Priority: **04.08.2000 IT RM000445**

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(54) **Coating for a polishing wheel, particularly for polishing stone material and method for manufacturing the same**

(57) The invention concerns a coating for a smoothing and/or polishing element, particularly a flexible grinding wheel, provided with a flexible abrasive insert, for smoothing and polishing stone material, comprising an epoxidic, comprising an epoxidic resin with poli-sul-

phuric polymers in a percentage between 34 and 52%, a product to make the mixture thixotropic, in percentage between 12 and 19%, primary amines, in percentage between 9 and 18%, and synthetic diamond, treated by a polyvinyl-formal primer.



**Fig. 2**

## Description

**[0001]** The invention concerns a coating for a smoothing and/or polishing element, particularly a flexible grinding wheel, provided with a flexible abrasive insert, for smoothing and polishing stone material (marble, granite, sandstone, glass, ceramic, various agglomerates, and so on).

**[0002]** The invention further concerns a grinding wheel provided with said coating, a process for obtaining the same, as well as a process for realising the same.

**[0003]** At present, no solution exists in the abrasive field, as well as in the field of the relevant alloying elements, suitable to smooth the above materials, that allows to realise:

- 1) shaped grinding wheels for smoothing and polishing shaped profiles, frames, Greek key design, toroidal profiles;
- 2) grinding wheels for straight, cylindrical or rotative flat tool ribs;
- 3) plateau for polishing marble plates and similar;
- 4) rotative flat tools for polishing flat or convex ribs on marble and similar;
- 5) frankfurt sectors for band polishing machines;
- 6) cloths form or diapad sectors for flat or shaped surfaces, hand used or used by orbital honing machines;
- 7) small plates, rotative flat tools or disks used with portable rotative or roto-orbital machines.

**[0004]** At present, the above mentioned tools are realised by the following technique, and employing, among the others, the following materials;

- a) rigid binding grinding wheels with a rigid support;
- b) magnesian binding with silicon carbide abrasive;
- c) synthetic binding with silicon carbide abrasive;
- d) synthetic binding with diamond abrasive;
- e) resinoid binding with natural or synthetic diamond abrasive.

**[0005]** All the above raw material have a rigid structure, so as they have to be moulded on a rigid support, not being consequently possible to guarantee the elasticity features that are nowadays necessary in most cases.

**[0006]** Another known technique is the one relevant to the grinding wheels with elastic rubber support, having elastic diamond cloths. By this kind of technique, a sufficiently flexible product is obtained, characterised by a rubber body having a diamond cloths insert, particularly used to work shaped profiles.

**[0007]** It is well known in the field that diamond cloths are cloths comprised of a textile base with an electrolytic or resinoid insert, having the diamond as abrasive element, with a thickness ranging from 0.6 and 1 mm, 0.5

tenths of which comprising the thickness of the cloth, the remainder being, as already said, comprised of an electrolytic or resinoid diamond spreading.

**[0008]** However, the above mentioned known techniques have some drawbacks, mainly when they are employed on shaped grinding wheels, destined to the working of toroidal shaped profiles, or of profiles having a different shape.

**[0009]** Problems encountered during the working can be individuated in the analyses of the various working phases providing a first step, in which a diamond grinding wheel comprised of a metallic body and insert with coarse grain sintered diamond treatment (usually 40/50 mesh), or electrodeposited, electrolytic (for marble) or with a sintered metallic binding (for granite), a second step employing a grinding wheel having the above features, but a more fine diamond granulometry, of about 170/200 mesh, that can vary according to the user choice.

**[0010]** The following steps provide the use of not metallic grinding wheels.

**[0011]** Main problem is faced up when the user works employing grinding wheels of the resinoid synthetic magnesian type.

**[0012]** Another kind of instrument presently used is comprised of shaped grinding wheels made up of synthetic or resinoid binding, with traditional abrasive, such as silicon carbide and like.

**[0013]** These grinding wheels, independently from the used abrasive, are characterised by a usually metallic inner insert, while remaining parts are comprised of the above mentioned alloying elements materials.

**[0014]** The above problem is due to the incompatibility between these grinding wheels and the grinding wheel of the metallic type according to the previous working step.

**[0015]** In fact, it is very difficult to realise a profile exactly corresponding to the previous one, being sufficient few hundredths of difference to prevent the uniformity of polishing.

**[0016]** Thus, one is in the situation of working with resinoid synthetic grinding wheels in case of a deformed and scored profile, with the consequent unavoidable damaging of the same.

**[0017]** During last years, requests relevant to the shaped profiles are always putting big problems, and present technologies do not allow to satisfy all the above needings, as far as costs, time, finishing and polishing are concerned.

**[0018]** Summarising the above, synthetic and resinoid grinding wheels deforms and scores since they are comprised of soft alloying elements, grinding wheels having a rubber body with diamond cloths insert (gluing) do not deforms, but quickly destroy, since cloth, being subjected to an undue work, easily tears and unsticks from the body before having finished its standard wearing.

**[0019]** It is evident that cloths glued on a rubber body

are a provisional solution in absence of a specific technology.

[0020] As far as the finishing is concerned, as already said, the user must retouch by hand the profile, not being thus possible to carry out a perfect working.

[0021] In view of the above, it is suggested according to the present invention a solution able to solve all the above mentioned problems.

[0022] It is therefore specific object of the present invention a coating for a smoothing and/or polishing element, particularly a flexible grinding wheel, provided with a flexible abrasive insert, for smoothing and polishing stone material, comprising an epoxidic, comprising an epoxidic resin with poli-sulphuric polymers in a percentage between 34 and 52%, a product to make the mixture thixotropic, in percentage between 12 and 19%, primary amines, in percentage between 9 and 18%, and synthetic diamond, treated by a polyvinyl-formal primer.

[0023] In a preferred embodiment, said coating has a thickness between 0.3 and 1.2 mm.

[0024] Preferably, said epoxidic resins with poli-sulphuric polymers are present in a percentage of 45%.

[0025] Particularly, said epoxy resins with poli-sulphuric polymers can be comprised of TEXOS B210W®.

[0026] Preferably, said product to make the mixture thixotropic is present in a percentage of 15%.

[0027] Particularly, said product to make the mixture thixotropic is comprised of CARBOSIL®.

[0028] Preferably, said primary amines are present in percentage of 15%.

[0029] Particularly, said primary amines are comprised of BYTHE 1226X®.

[0030] Preferably, said synthetic diamond, treated by a polyvinyl-formal primer, is present in a percentage of 25%.

[0031] Particularly, said polyvinyl-formal primer is comprised of BRWY 21/B®.

[0032] The invention further concerns a grinding wheel comprising a coating as previously described.

[0033] It is further object of the present invention a process for coating a grinding wheel providing the following steps:

- a) the diamond is mixed immersing within a liquid product and it is dripped by a suitable sieve;
- b) the above is mixed with a pre-mixed product comprising a product to make the mixture thixotropic and with a polyvinyl-formal product;
- c) the above is dried for about 4 hours;
- d) the above is mixed, by a suitable mixer, with an epoxy resin with poli-sulphuric polymers, a product to make the mixture thixotropic, and primary amines;
- e) the above is injected within a mould;
- f) the mould is introduced along with the product within an oven for about 45" at the temperature of 90°;
- g) the above is withdrawn from the oven and ground

by the grinding wheel with a traditional system.

[0034] Preferably, said epoxy resins with poli-sulphuric polymers are provided in a percentage of 45%.

5 [0035] Particularly, said epoxy resins with poli-sulphuric polymers can be comprised of TEXOS B210W®.

[0036] Preferably, said product to make the mixture thixotropic is present in a percentage of 15%.

10 [0037] Particularly, said product to make the mixture thixotropic is comprised of CARBOSIL®.

[0038] Preferably, said primary amines are present in percentage of 15%.

[0039] Particularly, said primary amines are comprised of BYTHE 1226X®.

15 [0040] Preferably, said synthetic diamond, treated by a polyvinyl-formal primer, is present in a percentage of 25%.

[0041] Particularly, said polyvinyl-formal primer is comprised of BRWY 21/B®.

20 [0042] The present invention will be now described, for illustrative but not limitative purposes, according to its preferred embodiments, with particular reference to the figures of the enclosed drawings, wherein:

25 figure 1 is a front view of an apparatus to realise a grinding wheel according to the invention during a first working step;

30 figure 2 is a section view of an apparatus to realise a grinding wheel according to the invention during a second working step; and

figure 3 is a section view of an apparatus to realise a grinding wheel according to the invention during a third working step.

35 [0043] Coming now to observe the figures of the enclosed drawings, it is shown an apparatus to manufacture a grinding wheel according to the invention.

[0044] Said apparatus is one of the possible embodiments and does not constitute a limitation of the scope, since it is not an essential feature for the claimed object.

40 [0045] A grinding wheel 2, already having the desired shape, is provided on a plate 1, divided in two parts 1' and 1".

[0046] Said plate 1 can be opened by the mechanism, generally indicated by the reference number 3, acting on the handle 4.

50 [0047] A temporary mould 5 is created about the grinding wheel 2, said mould 5 being provided with two channels 6 for casting the coating on the surface of the grinding wheel 2.

[0048] In this way, it is possible to realise profiles having any shape, without the need of making high investments to realise a definitive mould that would be used to make only few pieces. Obviously, in case it is necessary to make a mass production, it will be possible to make a definitive mould.

55 [0049] Two hemi-plates 1, 1", along with the two hemi-parts of the mould 5, can be separated (figure 3) to re-

move the grinding wheel 2 along with the coating.

[0050] The present invention has been described for illustrative but not limitative purposes, according to its preferred embodiments, but it is to be understood that modifications and/or changes can be introduced by those skilled in the art without departing from the relevant scope as defined in the enclosed claims.

#### Claims

1. Coating for a smoothing and/or polishing element, particularly a flexible grinding wheel, provided with a flexible abrasive insert, for smoothing and polishing stone material, **characterised in that** it comprises an epoxidic, comprising an epoxidic resin with poli-sulphuric polymers in a percentage between 34 and 52%, a product to make the mixture thixotropic, in percentage between 12 and 19%, primary amines, in percentage between 9 and 18%, and synthetic diamond, treated by a polyvinyl-formal primer.
2. Coating according to claim 1, **characterised in that** said coating has a thickness between 0.3 and 1.2 mm.
3. Coating according to claim 1 or 2, **characterised in that** said epoxidic resins with poli-sulphuric polymers are present in a percentage of 45%.
4. Coating according to one of the preceding claims, **characterised in that** said epoxy resins with poli-sulphuric polymers is comprised of TEXOS B210W®.
5. Coating according to one of the preceding claims, **characterised in that** said product to make the mixture thixotropic is present in a percentage of 15%.
6. Coating according to one of the preceding claims, **characterised in that** said product to make the mixture thixotropic is comprised of CARBOSIL®.
7. Coating according to one of the preceding claims, **characterised in that** said primary amines are present in percentage of 15%.
8. Coating according to one of the preceding claims, **characterised in that** said primary amines are comprised of BYTHE 1226X®.
9. Coating according to one of the preceding claims, **characterised in that** said synthetic diamond, treated by a polyvinyl-formal primer, is present in a percentage of 25%.
10. Coating according to one of the preceding claims, **characterised in that** said polyvinyl-formal primer is comprised of BRWY 21/B®.
11. Grinding wheel, **characterised in that** it comprises a coating according to one of the claims 1 - 10.
12. Process for coating a grinding wheel providing the following steps:
  - a) the diamond is mixed immersing within a liquid product and it is dripped by a suitable sieve;
  - b) the above is mixed with a pre-mixed product comprising a product to make the mixture thixotropic and with a polyvinyl-formal product;
  - c) the above is dried for about 4 hours;
  - d) the above is mixed, by a suitable mixer, with an epoxy resin with poli-sulphuric polymers, a product to make the mixture thixotropic, and primary amines;
  - e) the above is injected within a mould;
  - f) the mould is introduced along with the product within an oven for about 45" at the temperature of 90°;
  - g) the above is withdrawn from the oven and ground by the grinding wheel with a traditional system.
13. Process according to claim 12, **characterised in that** it is carried out at a temperature between 85° and 135° C.
14. Process according to claim 12 or 13, **characterised in that** said epoxy resins with poli-sulphuric polymers are provided in a percentage of 45%.
15. Process according to one of the claims 12 - 14, **characterised in that** said epoxy resins with poli-sulphuric polymers is comprised of TEXOS B210W®.
16. Process according to one of the claims 12 - 15, **characterised in that** said product to make the mixture thixotropic is present in a percentage of 15%.
17. Process according to one of the claims 12 - 16, **characterised in that** said product to make the mixture thixotropic is comprised of CARBOSIL®.
18. Process according to one of the claims 12 - 17, **characterised in that** said primary amines are present in percentage of 15%.
19. Process according to one of the claims 12 - 18, **characterised in that** said primary amines are comprised of BYTHE 1226X®.
20. Process according to one of the claims 12 - 19, **characterised in that** said synthetic diamond,

treated by a polyvinyl-formal primer, is present in a percentage of 25%.

21. Process according to one of the claims 12 - 20,  
**characterised in that** said polyvinyl-formal primer **5**  
is comprised of BRWY 21/B®.

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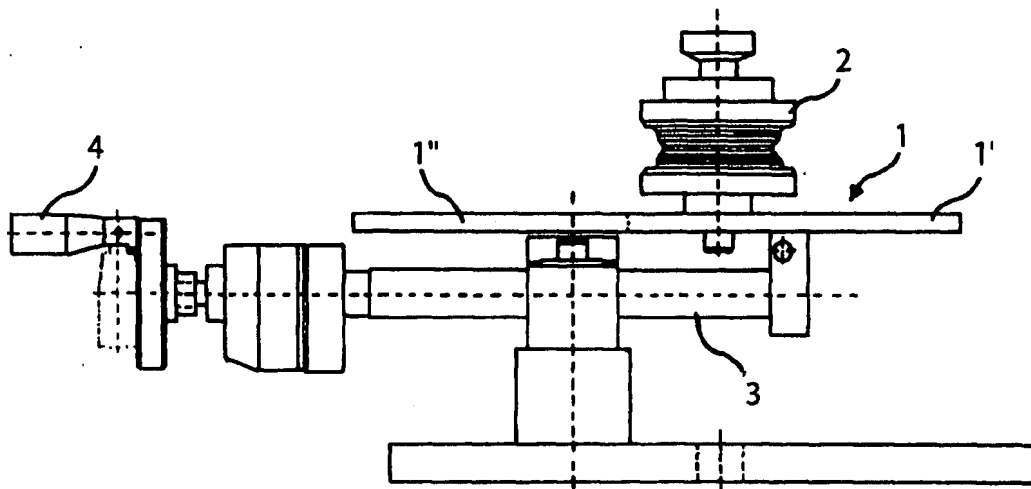


Fig. 1

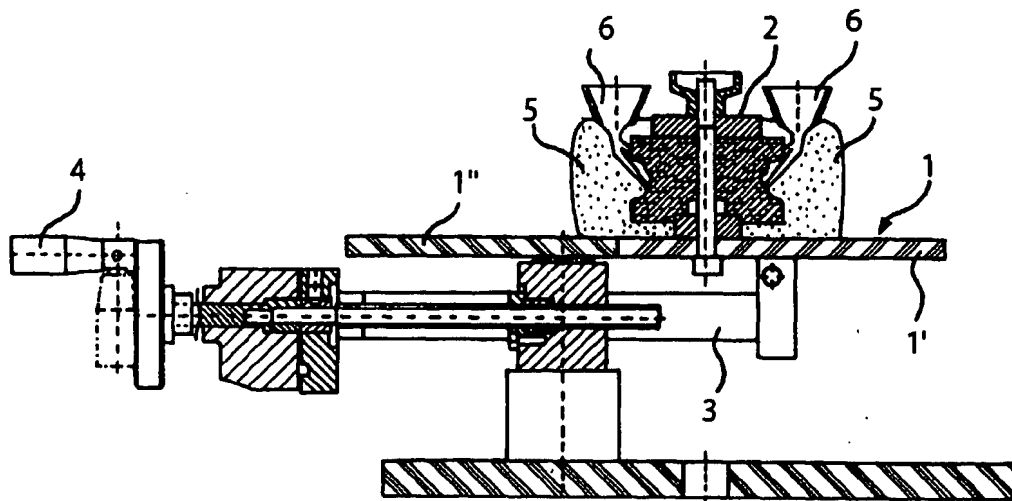


Fig. 2

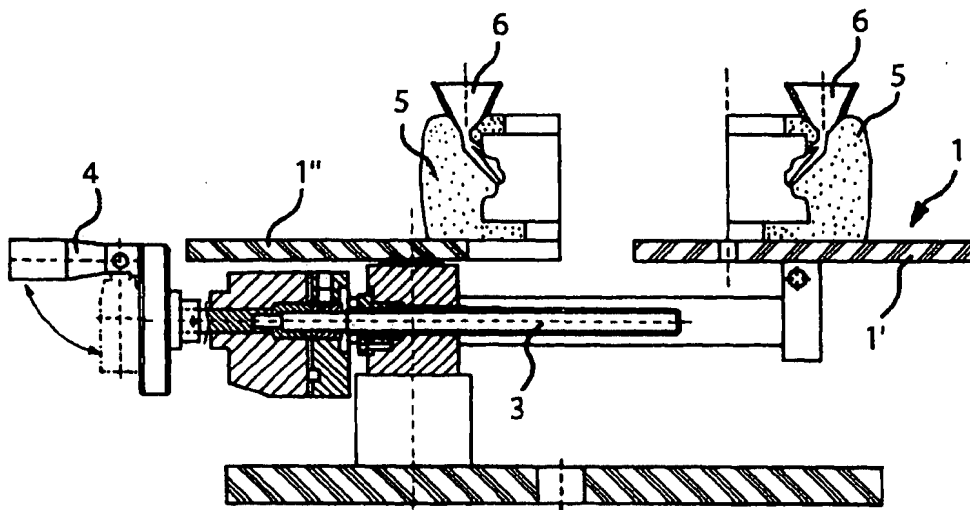


Fig. 3